Home work #6	Ch 8: 8.2, Ch 6: 6.1-6.2	Wed, 02/02/05

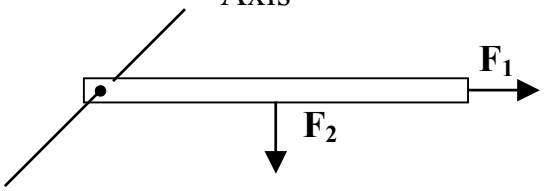
Ch. 8

Q9:

The greater torque will be produced when a force is applied at the end of the wrench because $\tau = Fl$, where τ = torque, F = force, l = lever arm.

Q10:

Only F_2 because torque describes the tendency of a force to produce a rotation and only F_2 should rotate the rod.



E8:

a) $\tau_{net} = Fl$ = (50 N) (0.24 m) = 12 N·m

b) $\tau_{net} = F(l/2)$ = (50 N) (0.24 m/2) = 6 N·m

E9:

$\tau_{net} = F_1l_1 - F_2l_2 = 0$, *or* $F_1l_1=F_2l_2$, $l_2 = (F_1l_1)/F_2$ = [(30 N) (0.1 m)]/20 N = 0.15 m

E10:

$\tau_{net} = F_1l_1 - F_2l_2 = 0$, *or* $F_1l_1=F_2l_2$, $F_2 = (F_1l_1)/l_2$ = [(5 N) (0.1 m)]/0.04 m = 12.5 N

Ch. 6

Q1:

$W_A = F_Ad_A$, $W_B = F_Bd_B$, if $F_A = F_B$ and $d_B = 2d_A$, $W_B = 2W_A$

Q2:

No. $W = Fd$, hence if $d = 0$, work on the rock is zero.

Q12:

No. The change in kinetic energy of a block is equal $W = (F_{net})d$ where F_{net} is the net force (the force applied to the string minus a frictional force).

E1:

$W = Fd = (40\text{ N})(2.5\text{ m}) = 100\text{ J}$

E2:

$W = Fd$, hence $F = W/d = (160\text{ J})/(4\text{ m}) = 40\text{ N}$

E6:

a) $W = Fd = (60\text{ N})(10\text{ m}) = 600\text{ J}$

b) $KE = \frac{1}{2}mv^2 = W = 600\text{ J}$

CP2:

a) $a = F/m = (50\text{ N})/(100\text{ kg}) = 0.5\text{ m/s}^2$

b) $d = \frac{1}{2}at^2 = \frac{1}{2}(0.5\text{ m/s}^2)(4\text{s})^2 = \frac{1}{2}(0.5\text{m/s}^2)(16\text{ s}^2) = 4\text{ m}$

c) $W = Fd = (50\text{ N})(4\text{ m}) = 200\text{ N}\cdot\text{m}$ (or J)

d) $v = at = (0.5\text{ m/s}^2)(4\text{s}) = 2\text{ m/s}$

e) $KE = \frac{1}{2}mv^2 = \frac{1}{2}(100\text{ kg})(2\text{ m/s})^2 = \frac{1}{2}(100\text{ kg})(4\text{ m}^2/\text{s}^2) = 200\text{ J}$

$KE = W = 200\text{ J}$